REMARKS

1.   In response to the Office Action mailed October 6, 2003, Applicants respectfully request reconsideration. Claims 42-69 were last presented for examination. All claims have been rejected in the current Office Action. The amendment to claim 67 are editorial in nature. No other claim have been amended, canceled or added. Thus, with entry of this paper, claims 42-69 will remain pending in this application. Of these 28 claims, four claims (claims 42, 57, 66 and 67) are independent. Further, these amendments do not narrow the scope of the claims .

2.   Based on the above Amendments and following Remarks, Applicants respectfully request that all outstanding objections and rejections be reconsidered, and that they be withdrawn.

Claim Rejections Under 35 U.S.C. §103

3.   The Examiner has rejected claims 42-69 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,234,884 to Kamen *et al.* (hereinafter "Kamen") in view of U. S. Patent No. 6,518,974 to Taylor *et al.* (hereinafter "Taylor"). Specifically, the Examiner asserts that Kamen teaches Applicants' claimed graphics system comprising "a two-dimensional graphics imaging [pipeline] constructed and arranged to manipulate two-dimensional (2D) images represented by pixel data comprising color and X, Y coordinate data, and excluding Z coordinate data" (sic). The Examiner refers Applicants to column 3, lines 45-52 of Kamen in support of this assertion. The Examiner further asserts that Kamen also teaches "[compositing] separately generated three-dimensional (3D) images represented by pixel data comprising X, Y, Z coordinate and color data wherein the X, Y coordinate data define horizontal and vertical dimensions of a pixel's display screen location, and wherein the Z coordinate defines an orthogonal distance from viewpoint to the image rendered at a pixel". The Examiner refers Applicants to column 4, lines 1-38 of Kamen in support of this assertion. The Examiner acknowledges that Kamen does not explicitly teach a "2D graphics image pipeline" as claimed. Relying on column 10, lines 56-60 of Taylor, the Examiner asserts that Taylor teaches that such a 2D graphics image pipeline is well-known in the art.

4.   Based on the above interpretations of Kamen and Taylor, the Examiner contends that it would have been obvious at the time the invention was made to configure Kamen's system as claimed because Kamen's 2D graphics image system such as the 2D texture system can be implemented as a graphics 'pipeline' for performing the tasks of combining the 2D graphics

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data and the 3D object mesh structure." (*See,* Office Action, page 2.) Applicants respectfully traverse this rejection.

5. As noted, the Examiner asserts that it would have been obvious to configure Kamen's three-dimensional graphics pipeline "because Kamen's 2D graphics image system such as the 2D texture system (Kamen, figure 3) can be implemented as a graphics "pipeline" for performing the task of combining the 2D graphics data and the 3D object mesh structure." Although this statement is unclear, it appears that the Examiner is asserting that because it processes 2D texture maps, Kamen's texture mapping system can be implemented as a "2D pipeline." The Examiner's apparent position that any pipeline having 2D arrays (such as texture maps) can be implemented as a 2D imaging pipeline is in conflict with the definition of the term used in Applicants' specification and as understood by those of ordinary skill in the art.

6. It is well-settled that the terms of a claim are to be construed as defined in the specification. Where "words [are] defined in the specification [, they] should be given the same meaning in the claims." *Amazon.com Inc. v. Barnesandnoble.com Inc.,* 239 F.3d 1343 (Fed. Cir. 2001). Thus, "the PTO [is to] appl[y] to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in applicant's specification." *In re Morris,* 127 F.3d 1048, 1054-55 (Fed. Cir. 1997). "During patent examination, the pending claims must be given the broadest reasonable interpretation consistent with the specification. (*See,* MPEP §2111; emphasis added.)

7. Applicants' specification defines a "two-dimensional graphics imaging pipeline" as a graphics pipeline that processes pixel data having x and y coordinates and no z (depth) coordinate. (*See,* Applicants' application, pg. 3, ln. 26 – pg. 4, ln. 8.) A very detailed discussion of this aspect of Applicants' application was provided in the Response & Amendment filed July 18, 2002 ("Amendment A"). In Amendment A, Applicants also provided excerpts of "Introduction to Volume Rendering" by Barthold Lichtenbelt, Randy Crane and Shaz Naqvi, Prentice Hall PTR, 1998 ("Lichtenbelt") describing different types of graphics pipelines. (*See,* Amendment A, paras. 6, 7, 10; Attachment 1.) That discussion and associated excerpts illustrate that the definition of a "two-dimensional graphics imaging pipeline" as used by those of ordinary skill in the art is consistent with that used in Applicants' specification. A proper interpretation of Applicants' independent claim 42,

therefore, requires that the term "2D graphics imaging pipeline" be construed as a graphics pipeline configured to process pixel data having x and y and no z (depth) coordinate data.

8.   Kamen discloses a conventional three-dimensional graphics pipeline. The fact that Kamen utilizes texture mapping in its 3D imaging pipeline does not somehow convert that 3D imaging pipeline into a 2D imaging pipeline. Furthermore, an apparent presumption underlying the Examiner's rejection is that if a portion of a 3D imaging pipeline (e.g., a texture mapping sub-system) can be used to perform operations on 2D data (e.g., texture data) then those structures are equivalent to a 2D graphics imaging pipeline.

9.   This understanding of graphics imaging pipelines is misplaced. Neither a 3D imaging pipeline nor any portion thereof can be considered to be a 2D imaging pipeline regardless of how it is utilized. A 2D imaging or pixel pipeline processes 2D pixel data while a 3D pipeline processes primitive data. There is no capability provided in one rendering pipeline to perform the processing of the other pipeline because appropriate hardware and software are required in each to process the respective data types. Thus, Kamen teaches a 3D imaging pipeline that also translates 2D images into 3D images. Kamen does not teach, nor does it suggest, implementing a 2D pipeline as recited in Applicants' claims.

10.   Taylor does not provide that which is missing from Kamen. Taylor is directed to a computer graphics system with a particular approach for determining the rate of change of texture address variables as a function of pixel address variables. The computer graphics system disclosed in Taylor is a 3D imaging pipeline. Taylor refers the entire 3D pipeline as a "pixel engine" and provides an illustration of one embodiment in Figure 1 (*See*, Taylor, col. 2, ln. 66–col. 3, ln. 1.) In contrast to the Examiner's assertion, Taylor neither discloses, teaches nor suggests a 2D imaging pipeline. As noted, the Examiner relies on lines 56-60 of column 10 in Taylor in support of the interpretation that Taylor teaches a 2D imaging pipeline. This text describes nothing more than a pixel interpellator, which is one component of the 3D imaging pipeline illustrated in Figure 1 of Taylor. Thus, Taylor does not teach a 2D graphics image pipeline.

11.   Thus, Kamen teaches using a <u>3D imaging pipeline</u> to translate a 2D image in a 3D pipeline, and then to process the resulting 3D image. Taylor also teaches nothing more than a <u>3D imaging pipeline</u>. As such, Applicants assert that there is no teaching or suggestion in the art of record to modify Kamen to implement a <u>two-dimensional graphics imaging pipeline</u> <u>that manipulates 2D images and composites separately generated 3D images</u> as claimed. The

art of record is silent with regard to performing such operations or achieving such an objective. The Examiner has, therefore, failed to provide any evidence whether, in the form in some teaching, suggestion, incentive or inference in Kamen or other art of record, or in the form generally available knowledge, that one having ordinary skill in the art would have been lead to modify the relevant teachings of Kamen in the proposed manner. This is because no such motivation exists in the applied references. The only conclusion that could be drawn, based on the record of this application, is that the suggestion forming the basis of the Examiner's conclusion must have come from Applicants' own novel disclosure; that is, the Examiner appears to be engaging impermissible hindsight. Applicants' own novel disclosure cannot be used to supply the teaching or suggestion that is missing from the known art. Furthermore, for the reasons set out above, Applicants assert that even if one of ordinary skill at the time of the invention were motivated to modify Kamen as proposed by the Examiner, the resulting system would not contain nor it would have the advantages of Applicants' invention as recited in the independent claims. For at least these reasons, Applicants respectfully request that the rejection of independent claim 42 be withdrawn.

12. Independent claims 57 and 66 are directed to a method for compositing three-dimensional images and a two-dimensional imaging pipeline which is configured to manipulate 2D images represented by pixel data. The pixel data comprises color and X, Y coordinate data and excludes Z coordinate data. The method claims recite operations nowhere taught, disclosed or suggested in the art of record. For example, in claim 57 there is no disclosure, teaching nor suggestion in the art of record of "processing in the 2D imaging pipeline Z coordinate data of a next 3D image to determine whether the stored or next 3D image is to be rendered at each pixel in a resulting composited image..." Similarly, independent claim 67 is directed to a graphic system comprising a two-dimensional imaging pipeline configured to manipulate two-dimensional (2D) images and to composite a separately-generated three-dimensional image stored in a frame buffer, and a next 3D image. There is no disclosure, teaching or suggestion to provide a two-dimensional imaging pipeline that comprises "a color data channel adapted to receive Z coordinate data and color data of a next 3D image" as claimed. For at least these reasons, Applicants respectfully assert that independent claims 57, 66 and 67 are patentable over the art of record.
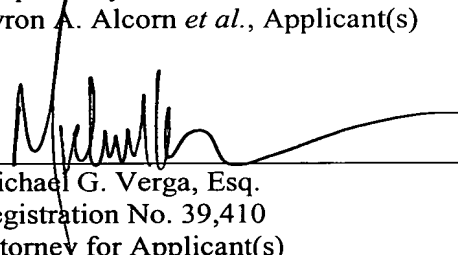
Dependent Claims

13.   The dependent claims incorporate all of the subject matter of their respective independent claims and add additional subject matter which makes them a fortiori and independently patentable over the art of record. Accordingly, Applicants respectfully request that the outstanding rejections of the dependent claims be reconsidered and withdrawn.

Conclusion

14.   In view of the foregoing, this application should be in condition for allowance. A notice to this effect is respectfully requested.

Respectfully submitted
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Date: January 6, 2004
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